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(71) Applicant
Hugh Steeper Limited

(Incorporated in the United Kingdom)

237-239 Roehampton Lane, London SW15 4LB,
United Kingdom

(72) Inventor
Martin Kemp

(74) Agent and/or Address for Service
Bromhead & Co
19 Buckingham Street, London, WC2N 6EF,
United Kingdom

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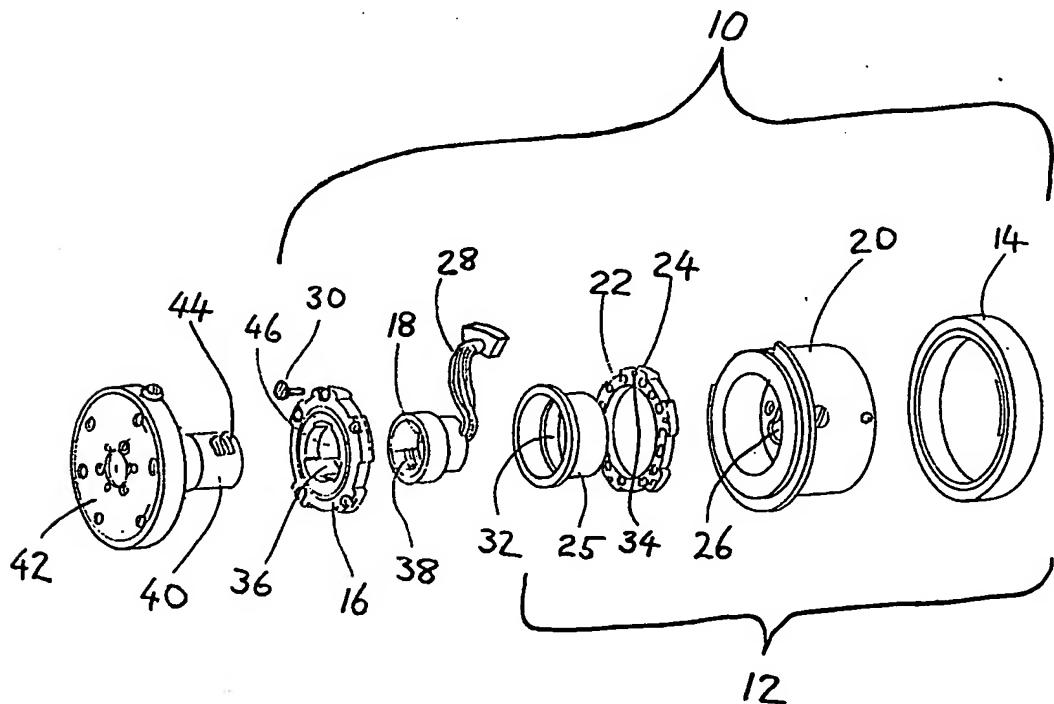
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(54) Artificial Wrist Unit

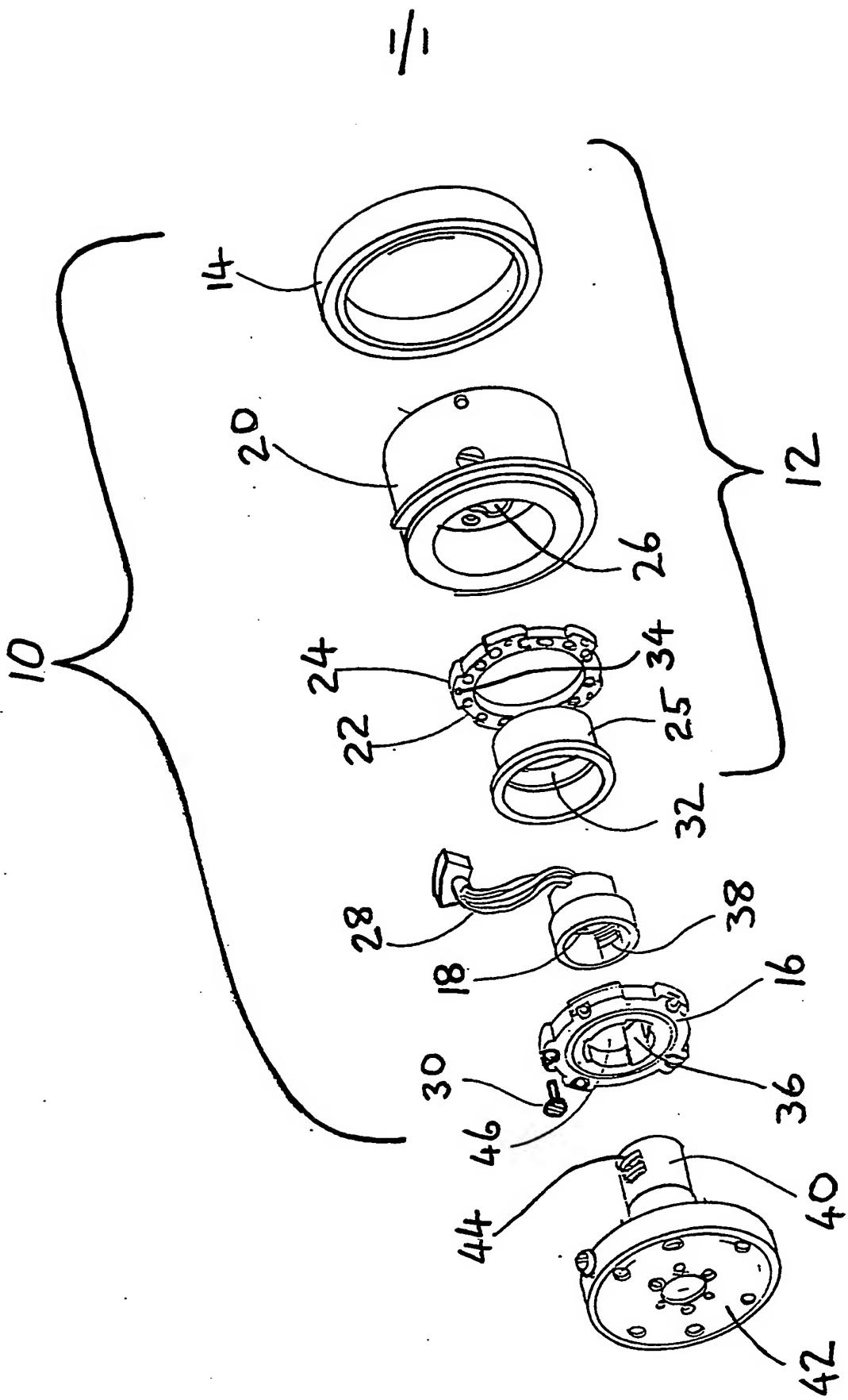
(57) The unit comprises a main part 12 having a knurled ring 14, a connector disc 16 moulded from synthetic plastics, and a cup-shaped contact-carrying member 18 moulded from elastomeric material, there being electrical contacts incorporated into the material of the member 18 so as to prevent the contacts being easily damaged or becoming clogged with dirt. The main part 12 additionally comprises a metal body 20 having a front plate 22 formed with radially-extending ridges 24 for receiving screws and a bearing / retainer member 25, the body 20 having a central opening 26 through which wires 28 are able to pass into the contact carrier 18 when the parts 12, 16 and 18 are telescoped together. The assembled unit receives a spigot 40 of hand plate 42 which carries pairs of spaced-apart contacts 44 for contact with those carried by member 18.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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Artificial Wrist Unit

This invention relates to artificial wrist units, that is to say, manufactured wrist units which serve to connect an artificial hand or the equivalent to the lower end of a human arm or to the lower end of an artificial arm.

Artificial wrist units which permit the detachable connection of a hand or the equivalent to an arm are already known. In such wrist units it is necessary for provision to be made for electrical power to be transmitted through the unit to an electric motor either in the wrist unit or in the hand itself, and it is normal for the necessary electrical connection to comprise spring contacts made, for example, from thin beryllium copper strip. However, these thin metal strips are easily damaged and can become clogged with dirt which makes them ineffective. They are also difficult to manufacture accurately and to fit without being damaged in the process.

The aim of the present invention is to overcome this disadvantage of existing wrist units. To this end, an artificial wrist unit in accordance with the invention makes use of "solid" electrical contacts which are moulded into one or more moulded parts of the wrist unit.

By way of example, a specific artificial wrist unit in accordance with the invention is shown in exploded view in the single figure of the accompanying drawing.

The drawing shows a wrist unit 10 comprising a main part 12 having a knurled ring 14, a connector disc 16 moulded out of synthetic plastics material, and a cup-shaped contact-carrying member 18 which is moulded out of an elastomeric material. The main part 12 of the unit comprises a metal body 20 having a front plate 22 of castellated form so that radially-extending ridges 24 are formed at spaced-apart intervals round its periphery. The front is retained by bearing/retainer 25. The metal part 20 has a central opening 26 through which electrical contacting wires 28 are able to pass into the cup-shaped contact-carrier 18. The connector disc 16 is adapted to be screwed by means of screws 30 on to the front plate 22, the disc 16 being of castellated form round its periphery in a similar way to the plate 22.

Thus, when the three components 12, 16 and 18 are telescoped together, the cup-shaped contact-carrier 18 lies snugly within a recess 32 in the metal body 20 and is held there by the connector disc 16 when the screws 30 are screwed into corresponding screw holes 34 on the front plate 22. Unwanted rotational movement of the cup-shaped contact-carrier 18 in the metal body 20 is prevented by axially-extending spigots 36 on the connector disc 16 which extend into corresponding recesses 38 in the cup-shaped contact-carrier 18.

The assembled wrist unit is now able to receive an axially-extending central spigot 40 on a handplate 42 which

is adapted to be fitted to an artificial hand or equivalent member. The spigot 40 is made of a synthetic plastics material and carries pairs of spaced-apart electrical contacts 44 which are moulded into the spigot but which project above its cylindrical surface. The spigot 40 passes through the central hole 46 in the connector disc 16 and lies within the cup-shaped contact-carrier 18 which has pairs of electrical contacts 48 moulded into its inner cylindrical surface which are thus able to make good electrical contact with the contacts 44.

Because the contact-carrier 18 is made of an elastomeric material, the carrier 18 provides the necessary spring pressure to urge the respective electrical contacts 44, 48 into intimate contact when the spigot 40 enters the carrier 18. This is a substantial improvement over the electrical connections provided in existing wrist units.

The handplate is secured to the wrist unit by the provision of a castellated inner edge 40 which is able to co-operate with the castellated outer periphery of the connector disc 16 so as to lock the two together. The design can be such that a twisting movement through, say, 15° permits the two parts to be moved into their locking and unlocking positions with respect to each other. A catch 52 is provided on the periphery of the handplate so as to engage a corresponding part on the connector disc 16.

The knurled ring 14 on the wrist unit operates a rotation lock which, when released, allows the connector

assembly and handplate as well as the terminal device to rotate as a unit on a spring ball detent unit.

Quite apart from the advantages given by the novel form of electrical connection described above, a further advantage is that the wrist unit can be fitted into existing connector systems using, for example, existing 6-way connectors. In addition, it requires no soldering or other wiring connections to be made by a prosthetist when making up an artificial arm. Yet another advantage is that the unit can be used with all available appliances simply by fitting a suitable handplate, the unit being made in one basic size (the smallest size) with moulded spacers to increase the wrist diameter where that is required.

Claims

1. An artificial wrist unit adapted to connect an artificial hand or the equivalent to the lower end of a human arm or to the lower end of an artificial arm, there being electrical contacts in the wrist unit for the transmission of electrical power to an electric motor either in the wrist unit or in the hand itself, in which, to prevent the electrical contacts from being easily damaged or becoming clogged with dirt, they are incorporated into one or more moulded parts of the wrist unit.

2. A wrist unit according to claim 1 comprising a main part having a knurled ring, a connector disc moulded out of synthetic plastics material, and a cup-shaped contact-carrying member which is moulded out of an elastomeric material.

3. A wrist unit according to claim 2, in which the main part of the unit comprises a metal body having a plate of castellated form so that radially-extending ridges are formed at spaced-apart intervals round its periphery, the plate being retained by a bearing retainer.

4. A wrist unit according to claim 3, in which the metal body has a central opening through which electrical contacting wires are able to pass into the cup-shaped contact-carrier.

5. A wrist unit according to any one of claims 3-4, in which the connector disc is adapted to be screwed by means of screws on to the castellated plate, the disc being of castellated form round its periphery in a similar way to the plate.

6. A wrist unit according to any one of claims 3-5, in which the cup-shaped contact-carrier lies snugly within a recess in the metal body and is held there by the connector disc when screws are screwed into corresponding screw holes on the castellated plate.

7. A wrist unit according to any one of claims 3-6, in which unwanted rotational movement of the cup-shaped contact-carrier in the metal body is prevented by axially-extending spigots on the connector disc which extend into corresponding recesses in the cup-shaped contact-carrier.

8. A wrist unit according to any preceding claim which is adapted to receive an axially-extending central spigot on a handplate which is capable of being fitted to an artificial hand or equivalent member.

9. A wrist unit according to claim 8, in which the spigot is made of a synthetic plastics material and carries spaced-apart electrical contacts which are incorporated into the spigot but which project above its cylindrical surface.

10. A wrist unit according to claim 9 when appendent to claim 2, in which the spigot passes through a central

hole in the connector disc and lies within the cup-shaped contact-carrier whose electrical contacts are thus able to make good electrical contact with the contacts on the spigot.

11. A wrist unit substantially as described herein with reference to the accompanying drawing.